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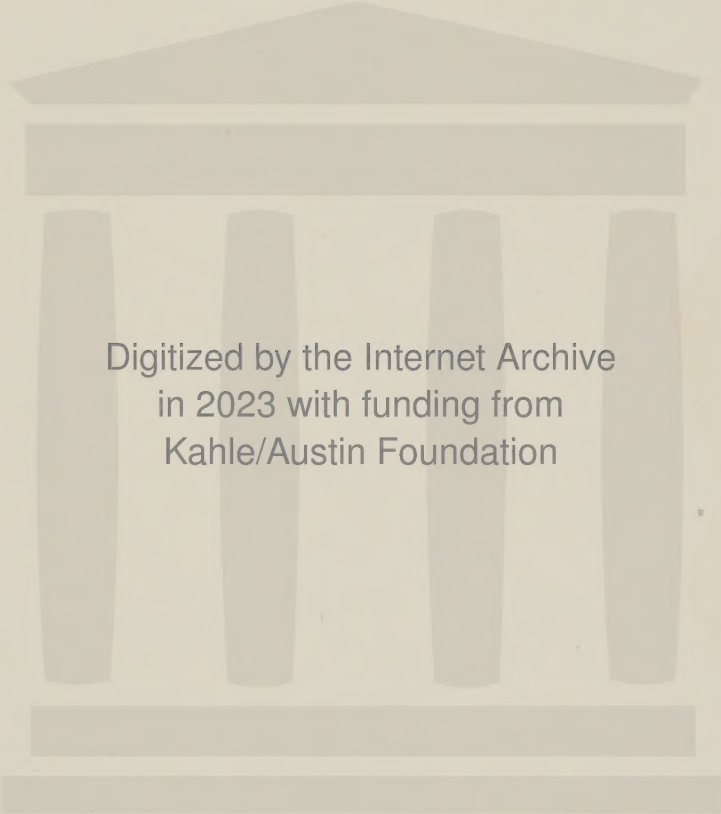
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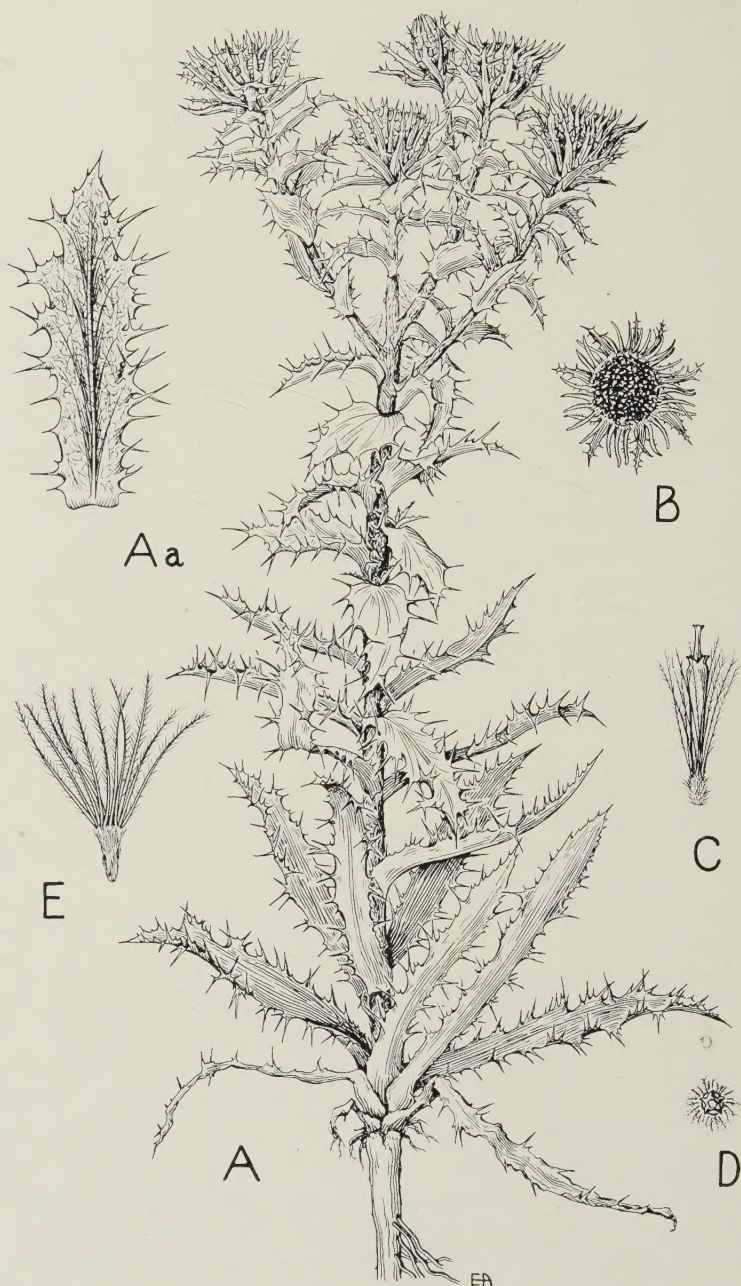
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CARLINA VULGARIS

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CARLINA VULGARIS IN THE CAYUGA QUADRANGLE, 42-43° N., 76-77° W.

ROBERT T. CLAUSEN¹

(Plate 1120)

IN 1944, on April 9, while walking in open woods on the slope near the southwestern corner of Cayuga Lake, I observed a strange thistle which I was unable to identify with the aid of Gray's Manual or Britton and Brown's Illustrated Flora. Subsequently, in 1948, my class in taxonomy encountered many plants of this same thistle in the vicinity of Dryden, Tompkins County, New York. The first specimens, obtained in April, retained a few fruits which had persisted through the winter. The achenes were grayish and densely strigose, very different from those of species of *Cirsium*, *Carduus* or *Onopordum*, but the pappus was plumose as in *Cirsium*. The involucrel bracts, spreading in rotate fashion, and the very spiny leaves, finely arachnoid-pubescent dorsally, were distinctive. Following failure to identify specimens with these characteristics using the manuals mentioned above or the books on weeds by Muenscher and by Fogg, I consulted the key to the genera of composites, prepared by Dr. Wilhelm Miller, in Bailey's Standard Cyclopaedia of Horticulture. There, I was able to determine the genus as *Carlina* and the species as *C. vulgaris* L. Subsequent comparison with herbarium specimens from Europe has substantiated this identification.

¹ The cost of publication of the accompanying plate is being met by the Department of Botany, Cornell University.

In the present season, 1948, I have followed with interest the development of *Carlina* in the vicinity of Dryden. The plants occur in several pastures and fields a few kilometers apart. One of the largest stands is in a pasture along a small brook 1.8 km. southeast of Dryden Lake. This pasture is in the extreme western portion of Harford Township, Cortland County, N. Y. There the plants had made good vegetative growth and were with large floral buds on July 25. Three weeks later, on August 15, many of these same plants were in flower. The specimen illustrated in the plate is a plant collected on that date. The heads were of striking appearance. The inner spreading involucre bracts were stramineous and acuminate. These contrasted markedly with the dahlia-purple florets. The corollas were slender-tubular, 8.5 mm. long, with the tubes purple above, white below, 7.5 mm. long, and the lobes ovate, acute, 1 mm. long. The purplish, lanuginose stems also were distinctive.

Inquiry or investigation at several institutions, namely the Gray Herbarium, New York Botanical Garden, New York State Museum, United States National Herbarium and University of California has failed to reveal other records of any species of *Carlina* in North America. For that reason, I have distributed specimens of my collection no. 7287 to all of these institutions. Also a sheet of this collection is in the herbarium of Cornell University, along with specimens collected on May 9 and July 25, 1948. The present note and illustration may help readers to identify *Carlina vulgaris* and cause them to be on the watch for its occurrence elsewhere. Since its seeds are disseminated by the wind, it may become a pest on agricultural lands in the same way as various species of *Cirsium*. The infestation around Dryden still could be controlled without too great expense. A little effort now might avoid considerable nuisance in the future.

PLATE 1120. *CARLINA VULGARIS* from pasture near Dryden, New York. A. Habit sketch ($\times 0.4$). Aa. Leaf, dorsal surface ($\times 0.8$). B. Head from above ($\times 0.4$). C. Floret from side ($\times 1.6$). D. Floret from above ($\times 1.6$). E. Fruit ($\times 2.4$). Drawings by Miss E. M. Abbe.

DEPT. OF BOTANY, CORNELL UNIVERSITY, Ithaca, N. Y.

A NECESSARY TRANSFER IN *LIATRIS*.—In L. O. Gaiser's monograph, "The Genus *Liatris*", in *RHODORA* 48: 250. 1946, *Liatris*

spicata γ *racemosa* DC. (1836) is included in the synonymy of *L. graminifolia* (Walt.) Willd., var. *dubia* (Barton) Gray (1848). Although Gaiser does not mention DeCandolle's variety in her discussion of the types of the various components of *L. graminifolia*, she does include it in the list of unquestioned synonyms. Since DeCandolle's variety antedates Gray's by twelve years, it would seem that a transfer is necessary, namely:

LIATRIS GRAMINIFOLIA (Walt.) Willd., var. ***racemosa*** (DC.), comb. nov., based on *Liatris spicata* γ *racemosa* DC. Prodr. 5: 130. 1836.—HASKELL VENARD, Atlanta, Georgia.

CONTRIBUTIONS FROM THE GRAY HERBARIUM OF
HARVARD UNIVERSITY—NO. CLXIX

PART I. SOME IDENTITIES IN *BREWERIA*

M. L. FERNALD AND BERNICE G. SCHUBERT

(Plates 1121–1129)¹

Disturbed by the fact that *Breweria Pickeringii* (Torr.) Gray rests upon a plant from southeastern North Carolina (Wilmington) which was originally described as having the central flower of each "aggregate" inflorescence sessile, whereas the plants of southern New Jersey, western Illinois and adjacent Iowa, and the Oklahoma-Texas region have them pedicelled, the senior author has borrowed from several of the larger American herbaria all the material which has passed as *B. Pickeringii*. The present notes summarize the results of our study of the assembled material from these strikingly disjunct areas and another region not generally included in the stated range. Before entering upon discussion of that species, however, it is important to clear the identities of some earlier described species in order that any references to them may not be misleading.

BREWERIA AQUATICA (Walt.) Gray, Syn. Fl. N. Am. ii¹. 217 (1878), rests nomenclaturally on *Convolvulus aquaticus* Walt. Fl. Carol. 94 (1788), our PLATE 1121, FIG. 1. It has also been called *Stylisma aquatica* (Walt.) Chapm. Fl. So. U. S. 346 (1860) and *Bonamia aquatica* (Walt.) Gray, Man. ed. 5: 376 (1867).

¹ The cost of engraving met through aid from Mr. BAYARD LONG.

In all Gray's work, as summarized in the Synoptical Flora, he treated *Breweria aquatica* as a catch-all to include all plants of temperate North America in the subgenus *Stylisma* which he did not merge with the very different *B. humistrata* (Walt.) Gray and *B. Pickeringii* (Torr.) Gray. Under *B. humistrata* (our PLATE 1122) he placed the strikingly dissimilar *Convolvulus patens* Desr. (PLATE 1121, FIG. 2) and *C. trichosanthes* Michx. (PLATE 1123), while some specimens labelled by him as *B. humistrata* are of the very distinct *B. angustifolia* Nash (PLATE 1124). Nowadays, however, the name *Breweria aquatica* is generally applied to a plant with style cleft half way to base or still lower, filaments essentially glabrous, flowers mostly 3 in small corymbs, with the short bracts close to the base of the corymb, the pedicels and calyx densely villous (PLATE 1123), a plant which, we shall see, is quite unlike Walter's type. The name *C. trichosanthes* Michaux, as applied by Small, covers a plant very unlike Michaux's type (PLATE 1123, FIG. 1), for Small had a very slender plant, usually with narrower leaves, the solitary flowers long-stalked above the remote bracts, the calyx minutely tomentulose, the filaments villous (PLATE 1121).

It is evident that the types of Walter's *Convolvulus aquaticus*, Michaux's *C. trichosanthes*, Torrey's *C. Pickeringii* and some other types have entered only vaguely into recent interpretations. Walter's *C. aquaticus* was more fully described by him than many of his species:

aquaticus 9. caule tereti prostrato; foliis, petiolis brevibus, oblongis, nervo acuminatis, pubescentibus, alternis; pedunculis axillaribus, unifloris, folia aequantibus; bracteis duabus subulatis; calyce pentaphyllo tomentoso; floribus brevibus, rubro-pureis, tomentosis; stylo bipartito, capsula villosa.

Fortunately the Fraser scrap-book of fragments of Walter's plants contains definitely a "scrap" of *Convolvulus aquaticus*, no. 231 on p. 36 (our PLATE 1121, FIG. 1, $\times \frac{1}{2}$). This, so far as it goes, is identical with *C. patens* Desr. in Lam. Encycl. iii. 547 (1789), a portion of the TYPE of which is shown, $\times 1$, in PLATE 1121, FIG. 2. This type-sheet had previously been shown by

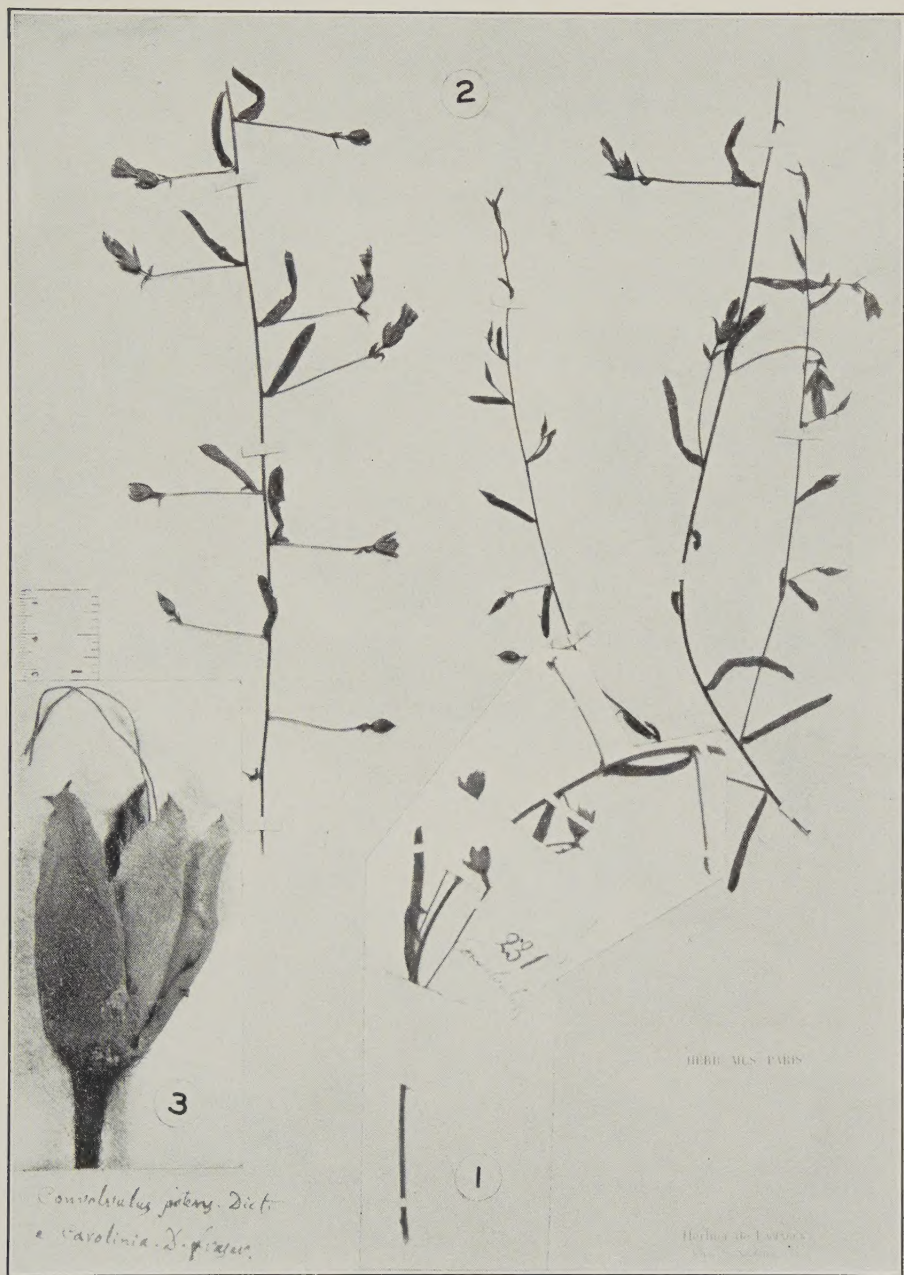


Photo. B. G. Schubert

BREWERIA AQUATICA: FIG. 1, TYPE OF *CONVOLVULUS AQUATICUS* Walt., $\times \frac{1}{2}$; FIG. 2, TYPE OF *Convolvulus patens* Desr., $\times \frac{1}{2}$; FIG. 3, calyx and style, $\times 5$, from southwest of Hinesville, Liberty Co., Georgia, Wiegand & Manning, no. 2632.

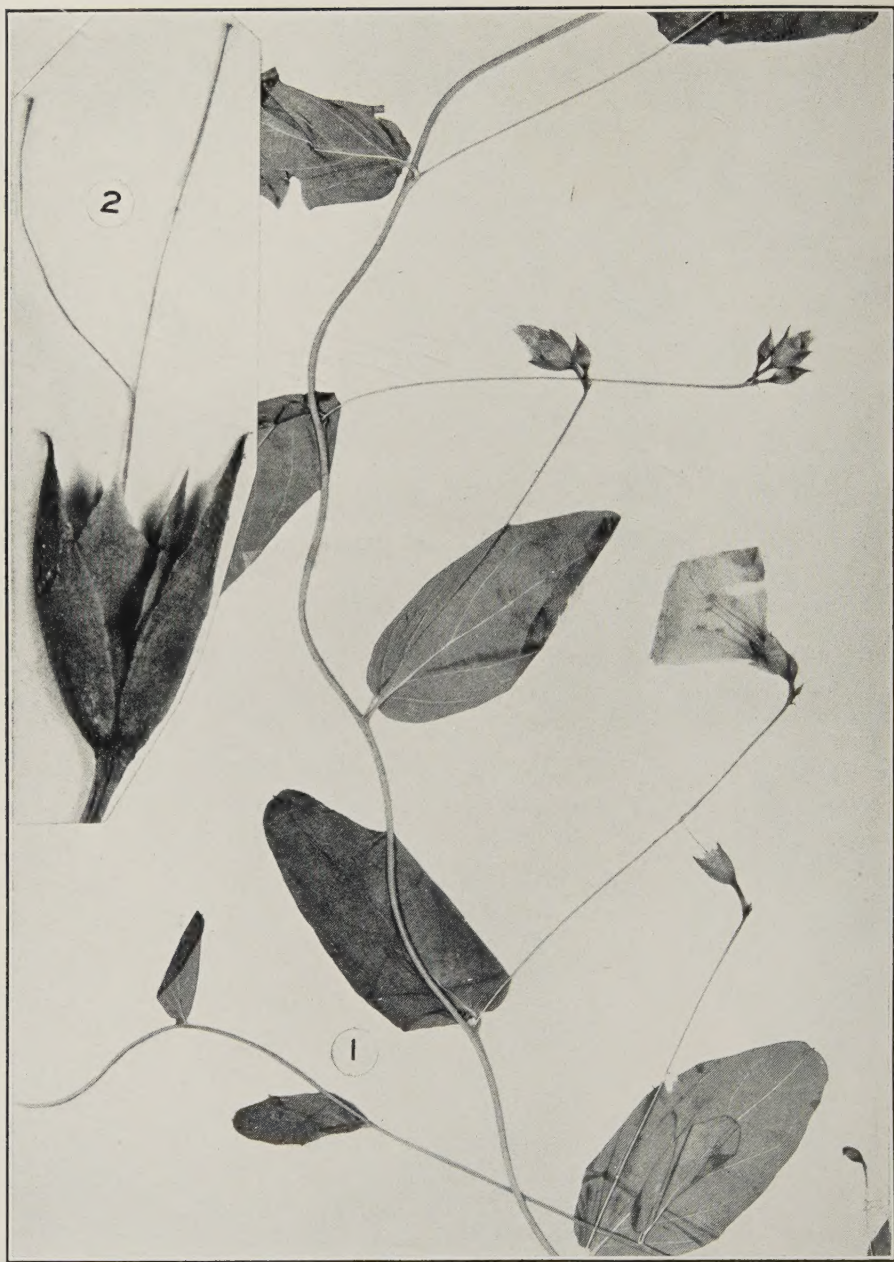


Photo. B. G. Schubert

BREWERIA HUMISTRATA: FIG. 1, portion of flowering branch, $\times 1$, from Pee Dee near Mars Bluff Bridge, Florence County, South Carolina, *Wiegand & Manning*, no. 2635; FIG. 2, calyx and style, $\times 5$, from east of Cahoon Pond, northwest of Suffolk, Virginia, *Fernald & Long*, no. 13,429.



Photo. B. G. Schubert

BREWERIA MICHAUXII: FIG. 1, TYPE, also TYPE of CONVULVULUS TRICHOSANTHES Michx., $\times \frac{1}{2}$, after *Cintract*; FIG. 2, portion of flowering branch, $\times 1$, of "*B. aquatica*" of most auth. from Miami, Florida, *Curtiss*, no. 5855; FIG. 3, calyx and style, $\times 5$, from Punta Rassa, Florida, *Tracy*, no. 7719; FIG. 4, portion of flower, $\times 5$, to show long style-branches, from Miami, Florida, *Curtiss*, no. 5855.



Photo. B. G. Schubert

BREWERIA ANGUSTIFOLIA: FIG. 1, portion of plant, $\times 1$, from Dixon, Onslow County, North Carolina, *L. F. & Fannie R. Randolph*, no. 962; FIG. 2, calyx and summits of style, $\times 5$, from near McClellanville, Charleston County, South Carolina, *Godfrey & Tryon*, no. 176, as *B. patens*; FIG. 3, fruiting calyx, $\times 5$, from no. 962.

Fernald in RHODORA, xlii. t. 624, fig. 1 (1940). Walter's fragmentary type and the fuller one of Desrousseaux are readily matched by many specimens from the southeastern United States, such as *Wiegand & Manning*, no. 2632 from Liberty County, Georgia, our FIG. 3, this, like many other similar collections, distributed as *Breweria trichosanthes* sensu Small. We are, somewhat inconveniently, forced to make the following change:

BREWERIA AQUATICA (Walt.) Gray, Syn. Fl. N. Am. ii¹. 217 (1878), as to basonym only. *Convolvulus aquaticus* Walt. Fl. Carol. 94 (1788). *Conv. patens* Desr. in Lam. Encycl. iii. 547 (1789). *Stylisma aquatica* (Walt.) Chapm. Fl. So. U. S. 346 (1860), as to basonym only. *Bonamia aquatica* (Walt.) Gray, Man. ed. 5: 376 (1867), as to basonym only. *Breweria trichosanthes* sensu Small, Fl. Se. U. S. 959 (1903), not *Conv. trichosanthes* Michx., basonym. *Stylisma trichosanthes* sensu House in Bull. Torr. Bot. Cl. xxxiv. 148 (1907), not *Conv. trichosanthes* Michx., basonym. *Breweria patens* (Desr.) Fernald in RHODORA, xlii. 298, pl. 624 (1940). PLATE 1121.

As already pointed out by the senior author in RHODORA, l. c. the type of *Convolvulus trichosanthes* Michx. Fl. Bor.-Am. i. 137 (1803), our PLATE 1123, FIG. 1, $\times \frac{1}{2}$, therefore of *Breweria trichosanthes* (Michx.) Small, as to basonym only, is the plant which has been erroneously passing as *B. aquatica*. As indicating this identity a characteristic piece of a modern specimen, $\times 1$, (from Miami, Florida, *Curtiss*, no. 5855) and some enlarged details from other specimens, $\times 5$, are shown as figs. 2-4). Michaux's description and preserved TYPE are unequivocal; but, unfortunately, his specific name is illegitimate, since he cited as exact synonyms the two earlier species of Walter (1788), "*C. humistratus* et *aquaticus*. WALT." It is, therefore, necessary to use a different binomial; and since Michaux so clearly described his plant and left so characteristic a type we are calling it

BREWERIA **Michauxii**, nom. nov. *Convolvulus trichosanthes* Michx. Fl. Bor.-Am. i. 137 (1803), nom. illegit.; Fernald in RHODORA, xlii. 298 (1940). ? *Stylisma elliptica* Raf. N. Fl. N. Am. pt. iv. 55 (1838), not *B. elliptica* Smith & Schubert in Contrib. Gray Herb. cxxvii. 31, pl. 2, figs. 31 and 32 (1939). *B. trichosanthes* (Michx.) Small, Fl. Se. U. S. 959 (1903), as to basonym only, not as to plant described. *Stylisma trichosanthes* (Michx.) House in Bull. Torr. Bot. Cl. xxxiv. 148 (1907), as to basonym only, not as to plant described. *B. aquatica* sensu most Am.

auth., not as to basonym, *Convolvulus aquaticus* Walt. PLATE 1123.

From the synonymy given by House in his study of *Stylisma*, Bull. Torr. Bot. Cl. xxxiv., especially p. 149 (1907), under *S. aquatica* in his sense, i. e. our *Breweria Michauxii*, one would infer that there are two names available for this species. The first, *Convolvulus erianthus* Willd. ex Spreng. Syst. i. 610 (1825), described "C. foliis linearibus elongatis basi attenuatis nudiusculis, . . . pedunculis elongatis 1 floris", etc. can hardly be our plant, which has the very pubescent elliptic-oval to oblong leaves broadly rounded to cordate at base and the peduncles mostly 3-flowered. Until the type of Willdenow's species can be studied it would be futile to guess what he had. House also cites as belonging to this species *Stylisma elliptica* Raf. "Fl. Tellur. 4: 55. 1836". Obviously House did not closely inspect Rafinesque's account, for the species is not in Flora Telluriana (pt. 4 published in 1838) and p. 55 was occupied by generic and subgeneric segregates of Old World *Veronica*. In his New Fl. N. Am. pt. 4 (1838) Rafinesque described his *Stylisma elliptica* on p. 55. It is quite possible that Rafinesque had *B. Michauxii*, for his "leaves petiolate elliptical hardly pubescent, base subcordate, end obtuse mucronate" is rather definite for it (except "hardly pubescent") but "calix smooth" is not at all good for a closely pubescent calyx. This character and the "hardly pubescent" leaves immediately suggest *B. humistrata*. At any rate, the name cannot be taken over into *Breweria* because of the large-flowered Mexican *B. elliptica* Smith & Schubert (1939).

Now coming to the amazingly disjunct series known as *Breweria Pickeringii*, it is a somewhat striking fact that the TYPE and few extant specimens of the original *Convolvulus Pickeringii* Torr. in M. A. Curtis in Bost. Journ. Nat. Hist. i. 129 (1835) seem not to be matched by any other collection nor has anything conspecific with it been found in the type-area, the famous and much explored region of Wilmington, North Carolina. Both *B. angustifolia* (PLATE 1124) and true *B. aquatica* (PLATE 1121), misidentified as *B. Pickeringii*, have been collected farther up the valley of Cape Fear River; but Curtis stated that "Most of the species enumerated inhabit a circle around this place [Wilmington] of about two miles radius". In 1830 the population of

Wilmington was about 3000; now it is about twelve times that number, with a considerable summer increase, and its longest diameter is 5 miles. That may account for the lack of recent collections. Even the connection with the Wilmington plant (collected by Moses Ashley Curtis) of Dr. Charles Pickering is a bit obscure. The species, as *Convolvulus Pickeringii*, was published in the *Catalogue of Plants growing spontaneously around Wilmington, North Carolina*, from a manuscript received in September, 1834. In his introductory pages Mr. Curtis said (p. 86): "In preparing the Catalogue I have been kindly assisted by Dr. Torrey, whose name will at once ensure confidence in its general accuracy. To him have been communicated nearly all the doubtful and new species, and they have received numerous corrections and references." There is also acknowledgment of help from Dr. James F. McRee, but nothing about Pickering. On p. 105, under *Convolvulus*, there is an entry "*Pickeringii*. Tor. (26)", this indicating that Torrey was author of the name, and in the "Remarks on several Plants in the Catalogue" no. 26 (p. 129) is as follows:

(26) *Convolvulus Pickeringii*. Prostrate, villous; Leaves linear, 12-15 lines long, one line wide, obtuse, not mucronate; Peduncles longer than the leaves, 3 flowered; Flowers aggregate at the summit, two of them pedicelled in the axis of the leaves that exceed the flowers, with linear bracts at the base of the calyx which equal the flowers, the other sessile and without bracts. The upper peduncles become 2 and 1 flowered. Calyx very villous. Corol hairy, white; style 2 cleft a little below the summit, the parts unequal; Stigmas capitate. Hab. sandy barrens. Flowers June.

Allied to *C. patens*, but clearly distinct. First noticed by Dr. Pickering, to whom it is dedicated.

The original material sent to Torrey had Curtis's comment: "Nearer *C. trichosanthes*, var. *patens* Ph. than Elliott's *C. aquatica*?". In the remark of Torrey (or perhaps Curtis) at the end of the description there is the clue to the origin of the specific name. Charles Pickering had collected the New Jersey variety six years earlier, the label (in his own hand) of his specimen in Herb. Phil. Acad. reading:

(capsule one-seeded!)
4 miles from Quaker Bridge N. J.
Aug. 1828. C. Pickering

A portion of this Pickering specimen, characteristic for New Jersey, is shown in PLATE 1126, FIG. 1. That it superficially resembles *Convolvulus patens*; i. e. true *B. aquatica* (PLATE 1121, FIG. 2) is obvious, but it has elongate foliaceous bracts, shorter and blunter sepals and (when adequate material is examined) less deeply divided styles. Although the name *Pickeringii* was based on the New Jersey plant, the detailed description and the locality (Wilmington) of the Curtis plant (PLATE 1125) indicate that as the TYPE of the species. It is singular that Torrey did not enter the name on what is obviously the TYPE-sheet. In DC. Prodr. ix. 450 (1845) *Convolvulus Pickeringii* was called *Stylisma evolvuloides* Choisy, β . *angustifolia* Choisy, although the specimen seen was "comm. a Gray!", who had collected the New Jersey plant only. Incidentally, Choisy's *S. evolvuloides* could not have been more inclusive: made up of *Convolvulus humistratus* and *aquaticus* Walt., *C. patens* Desr., *C. tenellus* Lam. and *C. trichosanthes* Michx.!

As we interpret *Breweria Pickeringii*, the aggregate species (MAP 1) is characterized by its very narrow linear or linear-oblongate leaves; elongate peduncles bearing 1-3 (rarely-5) flowers, each inflorescence subtended by a pair of elongate bracts similar to the foliage-leaves, the densely pubescent broad sepals blunt or in two varieties pointed, the style shallowly cleft to barely notched or subentire. The remarkable disruption of range has resulted in the local fixity of some characters, although in the aggregate these isolated varieties have the most significant characters much alike. Typical *B. Pickeringii* (PLATE 1125), the plant of Wilmington, North Carolina, has the pubescence of branches, pedicels and sepals densely villous; the central flower of each small corymb or the single flowers sessile; the 2 lateral flowers of the 3-flowered corymbs on pedicels only 1-4 mm. long and 2-bracted at summit, the longer of the unequal branches of the style 2-3 mm. long.

Isolated from it, about 400 miles to the north, is the variety (PLATES 1126 and 1127) found locally in the Pine Barrens of New Jersey. Like typical *Breweria Pickeringii* in habit, foliage, pubescence, blunt sepals and style (except that the 2 branches may often be subequal), it has the single flower or the central one of 2-5-flowered corymbs raised above the bracts on a definite



Photo. B. G. Schubert

BREWERIA PICKERINGII: FIG. 1, TYPE, $\times 1$; FIG. 2, an inflorescence, $\times 5$, showing subsessile central flower and 2-cleft style.

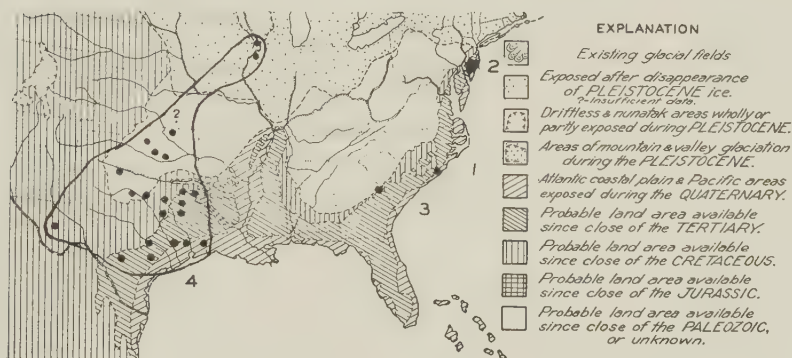


Photo. B. G. Schubert

BREWERIA PICKERINGII, var. CAESARIENSIS: FIG. 1, portion of the Pickering plant from New Jersey, $\times 1$, source of the name but not the description of the Curtis plant from Wilmington, North Carolina; FIG. 2, Pickering's label, $\times 2$; FIG. 3, calyx and style, $\times 5$, from the Pickering plant.

pedicel and the pedicels of the lateral flowers 0.5–1.5 cm. long. This localized plant we are calling var. *caesariensis*.

Near the fall-line, on the Savannah River, more than 250 miles southwest of Wilmington, the late Alfred Cuthbert collected on the sandhills near Atlanta, Georgia, a plant (PLATE 1128) which looks like *Breweria Pickeringii*, var. *caesariensis*, having the flowers all pedicelled, the lateral ones with pedicels up to 1.5 cm. long, but the sepals, instead of being blunt, are acuminate, a character suggesting *B. angustifolia* (PLATE 1124),



RANGES OF (1) *BREWERIA PICKERINGII*, var. *ANGUSTIFOLIA*; (2) var. *CAESARIENSIS*; (3) var. *CUTHBERTII*; (4) var. *PATTERSONI*.

but, var. *Cuthbertii* has the elongate foliaceous involucre and involucels (FIG. 2) and the only slightly cleft style of *B. Pickeringii*, with which Cuthbert originally identified it.

These three varieties of the Atlantic states form a consistent series, marked by the positively cleft style (with longer branch 2–3 mm. long), sepals blunt (except in the little known var. *Cuthbertii*) and the villosity tending to be fulvous. Farther west and still more isolated from the plants of southeastern North Carolina and of New Jersey there is a very strongly marked variety (PLATE 1129) with all the characters of the Atlantic series, except for a more canescent and closer pubescence, acute or acutish sepals (as in var. *Cuthbertii*) and, most marked of all, styles subentire or very shallowly cleft, with the longer branches rarely 1 and very rarely 1.5 mm. long. The difference in the branching of the style is the most significant, the acute or acutish

sepals less so, and the canescence of the pubescence probably a long-time response to more inland environment. We are, therefore, looking upon this more western plant as a far-isolated and itself bicentric variety, the larger area in Texas and Oklahoma, the smaller on dry prairies of Muscatine County in south-eastern Iowa and of adjacent Henderson County, Illinois. It thus approaches the northeastern corner of Missouri, a state from which it is not reported (doubtless Missourians would not admit that they have land sterile enough for it). This distinctive plant of dry prairies we are naming for the keen botanist of Henderson County, Illinois, the late Harry N. Patterson, whose model specimens are found in most of the herbaria studied.

B. PICKERINGII (Torr. in M. A. Curtis) Gray, var. **angustifolia** (Choisy), comb. nov. *Convolvulus Pickeringii* Torrey in M. A. Curtis in Bost. Journ. Nat. Hist. i. 105 and 129 (1835). *Stylisma evolvuloides* Choisy, *β. angustifolia* Choisy in DC. Prodr. ix. 450 (1845). *Bonamia Pickeringii* (Torr.) Gray, Man. ed. 5: 376 (1867). *Breweria Pickeringii* (Torr.) Gray, Syn. Fl. N. Am. ii¹. 217 (1878).—Characterized by its villous and rather fulvous pubescence; peduncles with linear or linear-oblongate foliaceous paired bracts at summit; flowers 3 in a close corymb or on the terminal shoots solitary, the central one sessile, the lateral ones on pedicels only 1–4 mm. long; sepals obtuse; style distinctly 2-cleft, the longer branch 2–3 mm. long.—Known only from the TYPE-COLLECTION, from dry sand, Wilmington, North Carolina, June, 1834 (TYPE) in Torrey Herb. (N. Y. Bot. Gard.), isotypes in Herb. Mo. Bot. Gard. and Herb. Phil. Acad. PLATE 1125.

Var. **caesariensis**, var. nov., a var. *angustifolia* differt floribus 1–5, omnibus pedicellatis, pedicellis lateralibus 0.5–1.5 cm. longis. —Dry sandy woods and openings, local, Pine Barrens of New JERSEY. TYPE: along Mullica River southwest of Batsto, August 21, 1910, *Bayard Long* in Herb. Phil. Acad. PLATES 1126 and 1127.

Var. **Cuthbertii**, var. nov., a var. *caesariensi* differt sepalis acuminatis.—GEORGIA: sandhills, Augusta, June 29, 1901, *Alfred Cuthbert*, TYPE in Herb. N. Y. Bot. Gard. PLATE 1128.

Var. **Pattersoni**, var. nov., caulibus pedicellis calycibusque plus minusve cinereo-pubescentibus; floribus pedicellatis; sepalis acutis; stylo subsimplice, subintegro vel breviter diviso, ramo longiore rariter 1 vel 1.5 mm. longo.—Dry sandy prairies, Henderson County, Illinois and Muscatine County, Iowa; more frequent in Oklahoma and widespread in eastern and southern Texas.¹

¹ In the United States National Herbarium there is a sheet from the Department of Agriculture bearing the data "Kansas, E. A. Papinoe, 1875". Otherwise we know of no evidence of the plant in Kansas.



Photo. B. G. Schubert

BREWERIA PICKERINGII, var. CAESARIENSIS: FIG. 1, portion of TYPE, $\times 1$; FIG. 2, branch showing fuller inflorescences, $\times 1$, from Pleasant Mills, New Jersey, July 27, 1882, H. R. Bassler; FIG. 3, fruiting calyx and style, $\times 5$, from New Jersey, Knieskern.



Photo. B. G. Schubert

BREWERIA PICKERINGII, var. CUTHBERTII, all figs. from TYPE: FIG. 1, TYPE, $\times \frac{1}{2}$; FIG. 2, an inflorescence, $\times 1\frac{1}{5}$; FIG. 3, calyx, $\times 5$.



Photo. B. G. Schubert

BREWERIA PICKERINGII, var. PATTERSONI: FIG. 1, portion of TYPE, $\times 1$; FIGS. 2 and 3, calyxes and styles, $\times 5$, from TYPE; FIG. 4, calyx and notched style, $\times 5$, from Grant Co., Oklahoma, *Waterfall*, no. 7370; FIG. 5, calyx and entire style, $\times 5$, from Weatherford, Texas, *Tracy*, no. 8068.

TYPE: prairies near Oquawka, ILLINOIS, August, 1873?, *Harry N. Patterson* in Herb. Patterson, Chicago Nat. Hist. Mus. PLATE 1129.

In this study we have had the advantage of seeing the material in the following herbaria, besides that in the Gray Herbarium: New York Botanical Garden; Academy of Natural Sciences of Philadelphia; United States National Herbarium; Duke University; State College of University of North Carolina, Raleigh; Chicago Natural History Museum; Missouri Botanical Garden; and University of Oklahoma (including a fine series of freshly collected specimens). To the officials of these institutions who have aided us by these loans we express our thanks and appreciation. Without these loans we should have remained in the dark regarding the original Curtis material and the unique var. *Cuthbertii*.

PART II. STUDIES OF EASTERN AMERICAN PLANTS

M. L. FERNALD

1. BLACKBERRIES, OLD AND NEW (PLATES 1130–1132)

RUBUS ALLEGHENIENSIS Porter, forma **suffultus**, f. nov. (TAB. 1130, FIG. 1), racemis valde bracteatis, bracteis 6–15 pedicellos plerumque superantibus.—Locally abundant in New England. The following are characteristic. NEW HAMPSHIRE: abundant in large colonies, Shelburne, *Fernald & Pease*, no. 15,738 (distrib. as var. *Gravesii* because essentially without prickles); border of dry woods, Shelburne, *Fernald & Pease*, no. 15,763; damp thickets, borders of woods and roadsides, Thornton Gore, *Fernald*, nos. 15,655, 15,700, 15,749 (TYPE in Herb. Gray.; ISOTYPE in Herb. New Engl. Bot. Cl.), 15,820; dry open sandy soil, Haverhill, *Fernald*, no. 15,771. MASSACHUSETTS: Beverly, 1886, *Asa Gray*; Ayer, May 30, 1934, *Ordway & Bullard*; roadside thicket, West Brookfield, July 9, 1935, *C. H. Knowlton*; dry roadside, Konkapot Valley, New Marlboro, July 24, 1912, *Ralph Hoffmann*. CONNECTICUT: below "Indian Burying Ground", Franklin, June 18, 1915, *R. W. Woodward*; Bristol, "a freak", *Blanchard*, no. 97, set 5; Southington, *Blanchard*, no. 97, set 3.

Although called by Blanchard "a freak", forma *suffultus* is, where I have well known it in the Franconia and the Androscoggin regions of New Hampshire, an abundant and very obvious and consistent plant of recent clearings and borders of woods.

PLATE 1130, fig. 1 shows the extreme development of racemes, much prolonged and with most of the pedicels subtended by simple overtopping bracts; but clear transitions to more typical *R. allegheniensis* occur. Thus, on no. 15,655 the upper racemes have 9–11 bracts but lower on the cane the lateral racemes are those of typical *R. allegheniensis*, with only 1–5 bracts. Forma *suffultus* suggests Bailey's illustration in Gent. Herb. v, 12, fig. 3 (1941) of a "novirame"; but the bracteate inflorescences of forma *suffultus* are the regular racemes of floricanes, not "novirames" on the primocanes!

R. ALLEGHENIENSIS, forma **calycosus** (Fernald), stat. nov. *R. nigrobaccus*, var. *calycosus* Fernald in RHODORA, iii. 234 (1901). *R. allegheniensis*, var. *calycosus* (Fernald) Fernald, l. c. x. 51 (1908); Bailey, Gent. Herb. v, fig. 232, E (1944).

I am holding *Rubus allegheniensis* in its inclusive sense for the relatively coarse, erect to high-arching species with velutinous lower leaf-surfaces, cylindric racemes mostly 1–3 dm. long and with stipitate glands numerous on rachis and pedicels. In so doing I heartily indorse Bailey's sensible attitude of 1902 in Cycl. Am. Hort. iv. 1578, when he wrote: "No end of species could be made, but it is doubtful whether a great multiplication of species-names would contribute anything more than confusion to the literature and knowledge of the genus" and (p. 1582) "There seems to be little utility in separating forms that cannot be distinguished in at least a fair proportion of the specimens". I cannot, however, wholly indorse the reverse attitude now so much in evidence because altogether too many minor variants and clones are being put out as "new species", for the author of the conservative and wholly safe doctrine of 1902 wrote in 1925 of "aberrants" which "may be species, nascent species, or kinds of nonconformities" and then went on to assure us that his "new species" are not necessarily true or conventional species after all:

"It will be understood, therefore, that when I write 'new species' (or *species nova*) I do not use the term in its old formal final sense; I am thinking of a congeries of plants so harmonious within itself and so distinct from all others as to require name and diagnosis if we are to discuss the subject intelligently; and I regret that modern practice has not given us a word of clearer accuracy and significance". —Gent. Herb. i. 205 (1925).

Some of the terms for minor variants which were used by

Ascherson & Graebner or the terms variety, subvariety, forma, forma biologica, forma specialis and individual or clone were available. Bailey, l. c., was opposed to throwing "them loosely or uncritically into some recognized species: this extends the confusion". But perhaps much that has been published on the group can hardly escape the tag, "uncritical"; at least it has often indicated "confusion".

To me there is no satisfaction, after many days of struggling with them, in trying to separate from *Rubus allegheniensis* (*R. nigrobaccus* Bailey) such selected and surely intergradient nearly *conformist* plants of Bailey, Gent. Herb. v. fasc. viii (1944) as *R. auroralis* (pp. 525, 526), *R. longissimus* (pp. 527, 528), *R. virginianus* (pp. 532, 533), *R. separ* (pp. 532, 534 and 535), *R. uber* (pp. 535 and 536), and *R. marilandicus* (pp. 537, 538); nor can I see anything more than a useless synonym in the name *R. Rappii* Bailey in Hanes, Fl. Kalamazoo Co., Mich. 156, fig. 14 (1947). To be sure, *R. longissimus* is distinguished, among other inconstant characters, in the key by "broad short obovate leaflets at base" of the "cluster 20 cm. long", but the bracteal leaflets shown in fig. 230 of characteristic *R. allegheniensis* are much more obovate, while, if they are significant, plenty of New England specimens with racemes up to 3 dm. long could be made to glorify all the sisters, cousins and aunts of the chance collectors. Furthermore, by the key *R. allegheniensis* comes under "Prickles on primocane axis many", while *R. virginianus* has "Prickles on primocane very few or none". Nevertheless, comparison of the figure of *R. allegheniensis* (fig. 230) and that of *R. virginianus* (fig. 240) shows about 13 small prickles on 14 cm. of primocane of the former ("Prickles . . . many") but 14 on 17 cm. of primocane of the latter ("Prickles . . . very few or none"). That seems like a pretty vague "specific" difference.

Again, I find myself equally puzzled (and others must be similarly so) by other reputed species of the § *Alleghenienses*. Under "B" in the key in Gent. Herb. v. 509, 510 (1944) *Rubus Rosa* Bailey and *R. alumnus* Bailey come under "Primocane leaflets . . . cordate", while *R. apianus* is under "BB. Primocane leaflets . . . not cordate, narrow or tapering to base . . .". Unfortunately, however, the would-be interpreter notes that the terminal primocane-leaflet of the last "species" is shown in fig.

252 as broadly ovate and somewhat cordate. Its apex is not quite so prolonged as shown for *R. Rosa* but the difference between this leaflet and the terminal "cordate" one shown for *R. alumnus* is scarcely evident.

As Bailey so forcefully stated in 1902, the designation of many trends as species can contribute nothing "more than confusion to the literature and knowledge of the genus". If he joined the once aggressive group of "mutationists" who saw a species in every clone and hybrid in *Oenothera* he could add still further "confusion"; or if he tackled *Carya* he could find hundreds of his "species" in every hickory-forest, for it is never safe to collect as one number specimens from two adjacent trees! "There seems to be little utility in separating forms that cannot be distinguished in at least a fair proportion of the specimens". Incidentally, it should not be overlooked that, nowadays, when Bailey calls a plant a "species", he does "not use the term in its old formal final sense". If he were an anthropologist what would he do with *Homo sapiens*?

§ *Alleghenienses* is well defined in Gent. Herb. v. 507 (1944) as "Gland-bearing highbush . . . brambles, . . . often very stout . . . inflorescence typically a long racemiform cluster with continuing axis . . . ; rachis of inflorescence, pedicels, usually the calyx, as mostly also the petiolules and parts of petioles, bearing stalked glands". That defines a well marked and generally understood section. It is, therefore, more than a bit perplexing to find in recent publications proposed new species, designated as belonging to the *Alleghenienses*, which patently lack these distinctive characters and as definitely display the significant characters of other defined and generally recognized sections. As striking and as disconcerting as any is *Rubus Bigelovianus* Bailey, l. c. iii. 255 (1934) and v. 558, fig. 245 (1944), a plant with the aspect, slender and bristly canes, essential lack of glands, cuneate floricanes-leaflets, and inflorescence and fruits of § *Setosi*; for this very characteristic section is described, l. c. 129, as "plants, of small size . . . characterized . . . by setose or stouter . . . armature on canes and pedicels and by rather short inflorescence that is likely in infrutescence to become as broad as long and cymiform . . . : floricanes often lopped or prostrate even though primocanes may be erect . . . , seldom

much more than about 80 cm. tall, . . . flowers small, commonly with narrow well separated petals: fruit small, usually acid and not pleasantly edible".

Rubus Bigelovianus, collected while Bailey was looking for *R. setosus* Bigel. in the general type-area, Sudbury, Massachusetts, and named for Jacob Bigelow, "commemorated his visit to Sudbury", presumably referring to the collection of *R. setosus* in June, 1823. Otherwise it would be most difficult to say what visit was commemorated, for Jacob Bigelow pleased his parents by making his first recorded "visit" at his birth in Sudbury on February 27, 1787, and his home was in Sudbury until he took up medical practice in Boston, his parents still continuing to reside at Sudbury¹.

RUBUS ALLEGHENIENSIS Porter, var. **populifolius**, var. nov. (TAB. 1130, FIG. 2), a var. typica differt foliis vel laminis bractearum elliptico-ovalibus vel subrotundatis obtusis 2.5–5 cm. longis latisve.—MASSACHUSETTS: border of woods, Stockbridge, July 16, 1916, *Ralph Hoffmann* (TYPE, 3 sheets, in Herb. New Engl. Bot. Club).

In the strongly rounded blades and leaflets of the bracteal leaves var. *populifolius* at once suggests *Populus tremuloides* and by some might be called a distinct species. Its primocane, however, has very characteristic leaves of typical *Rubus allegheniensis*, the long-petiolulate median and terminal long-acuminate leaflets cordate-ovate. The specimens were sent in as *R. Andrewsianus* Blanchard but they have the heavily stipitate-glandular petioles, petiolules, rachis and pedicels and the elongate raceme of *R. allegheniensis*.

Rubus Andrewsianus is one of the fifteen or twenty minor variants of *R. pensilvanicus* Poir. (1804) which have been designated as "species", a score which could be vastly multiplied if collections were made and named from tens of thousands of other burns and recent clearings. *R. pensilvanicus* and its host of minor variants belong to the series under § *Arguti*, which is characterized by lack of glands and by a corymbiform inflorescence. As an aggregate of minor trends, occurring through much of temperate eastern North America, it includes not only *R. Andrewsianus* but *R. philadelphicus* Blanchard, *R. pergratus*

¹ See GEORGE E. ELLIS. Memoir of Jacob Bigelow, Cambridge, 1880. Incidentally, see Fernald in Proc. Am. Phil. Soc. lxxxvi. 68 (1942).

Blanchard and many others. If anyone is skeptical, let him look at four plates in Gent. Herb. v: figs. 315 and 316 (*R. pensilvanicus*), 319 (*R. Andrewsianus*) and 321 (*R. philadelphicus*). Then, if he finds *specific* or any significant differences, let him illuminate those of us who have wasted many days in searching for them.

To be sure, the key (pp. 610 and 611) puts *Rubus pensilvanicus* under "Axis or peduncle of flower-cluster and the pedicels armed with stout thick-based strongly curved or hooked prickles", while *R. Andrewsianus* is under a contrasting "Axis or at least the peduncle of flower-cluster and the pedicels naked, or the prickles, if any, few and weak and not broad-based nor hooked". Nevertheless, the TYPE of *R. pensilvanicus*, as shown in the photograph sent to me from Paris, shows 16 of the 25 pedicels which are clearly visible quite without prickles, this type shown in Bailey's fig. 315, while the fruiting branchlet "a" shown by him as representative of this species, distinguished by "pedicels armed with stout thick-based strongly curved or hooked prickles", has all the pedicels shown as unarmed! In the figure (319) of *R. Andrewsianus* one can count 8 slightly armed pedicels, while in Blanchard's "set 1" from "type sta." in the Gray Herbarium several pedicels have two hooked prickles up to 2 mm. long. Again, try the illustration of *R. philadelphicus* (fig. 321). By the key (pp. 610 and 611) *R. pensilvanicus* and *R. Andrewsianus* have the "Floral leaflets and simple leaves (in the flower-cluster) . . . decidedly acute to acuminate or attenuate", those of *R. philadelphicus* "obtuse or only briefly abruptly acute". Nevertheless, there seems to be no definable difference in the tips of the leaflets as shown, for in "a", under *R. pensilvanicus*, the bracteal leaves and leaflets are shown as scarcely different from those of the others. If these are really different species they have successfully hidden their distinctive characters and they are, at best, "nascent species, or kinds of nonconformities not yet accounted for in our philosophies" (Gent. Herb. i. 205), reminding one of the simple and ungarnished yankee philosophy of Blanchard when he wrote, regarding another species: "The plants at all these stations differ a little from each other, but even at the type station a difference in soil and surroundings causes a considerable variation. This is to be expected nearly everywhere in the rose family"—Blanchard in Torrey, vi. 120 (1906).

Blanchard, of course, did not take into account Poiret's *R. pensilvanicus*, for, accepting the verdict of Index Kewensis, everyone supposed, until I secured a photograph of Poiret's type, that his species was "*R. strigosus*"!

As for *Rubus pergratus* Blanchard in RHODORA, viii. 96 (1906), that characteristic plant of southeastern Canada and New England, where its fruit is highly esteemed, seems to be a strong and large-fruited development of *R. philadelphicus*, with no clear morphological differences. As defined by Blanchard it has the primocanes bearing prickles which are "strong, stout, 2 to 8 to the inch of stem,"—the leaves pubescent beneath, the flowering shoots more or less pubescent, "even woolly on some"; i. e. it belongs in the § *Arguti*, which is defined by Bailey (Gent. Herb. v. 46) under "Leaves (and other parts) variously pubescent . . . prickles usually abundant, mostly hooked or bent or at least broad-based". But, for some reason not clear to others, *R. pergratus* has disappeared from his treatment of the *Arguti* and is placed under the § *Canadenses*, this section properly defined (l. c.) as having "Leaves essentially smooth . . . : canes without prickles or with only few and weak straight ones". This plant, with leaflets velvety to touch beneath, with stout hooked prickles and with a corymbiform inflorescence, has suddenly appeared, not only in § *Canadenses*, but under *R. canadensis* itself ("known by its thin usually glossy smooth foliage [by "smooth" meaning glabrous] . . . and in typical forms by its nearly or quite unarmed canes: . . . inflorescence . . . the primary narrow long-racemiform clusters") as *R. canadensis*, var. *pergratus* (Blanchard) Bailey, l. c. v. 470 (1944), with "Leaves soft-pubescent to the finger underneath, therefore gray and the lateral ribs more or less obscured", overlooking the strong prickly canes, the corymbiform inflorescence, etc. If the characters used in defining the sections mean nothing it is time to give up. They do, however, hold reasonably well if one will refrain from contradicting them and from describing in the glabrous § *Canadenses* plants with copious pubescence, or in the copiously glandiferous § *Alleghenienses* plants without glands, etc. The confusion is not primarily in the sections.

R. PENNSILVANICUS Poir., forma **phyllophorus**, f. nov., racemis plus minusve elongatis, bracteis numerosis.—With the typical

few-bracted plant or in more favorable habitats. The following belong here. NOVA SCOTIA: rich moist open thicket by brook, Sandy Cove, Digby County, *Fernald & Long*, no. 21,592, as *R. orarius*; spruce woods and thickets, Brazil Lake, Yarmouth Co., *Bartram & Long*, no. 23,991, as *R. orarius*. NEW HAMPSHIRE: borders of dry woods near Mascot Pond, Gorham, *Fernald & Pease*, no. 15,643, as *R. orarius*; dry thickets and borders of woods, Lincoln, July 28, 1917, *Fernald*, no. 15,701 (TYPE in Herb. Gray); damp thickets, borders of woods and roadsides, Thornton Gore, *Fernald*, no. 15,642.

In its very leafy-bracted raceme resembling *R. allegheniensis*, forma *suffultus* (PL. 1131, fig. 1) except for its glandless and more corymbiform raceme and the subglobose fruits, characters which place it with the polymorphic *R. pensilvanicus* of § *Arguti*. See discussion above.

RUBUS (§ ALLEGHENIENSES) **sceleratus** Brainerd, sp. nov. in lit., TAB. 1131 et 1132, valde adscendens inextricabiliter arcuato-ramosus, cannis tholos 1.8–3 m. altos formantibus; primocannis ad 1 cm. diametro densissime armatis; aculeis rectis horizontalibus deltoideo-subulatis vel subulatis vel aciculiformibus, glandulis stipitatis intermixtis; primocannae foliis quinatis supra glabris subtus fulvo-tomentosis, foliolo terminali late ovato acuminato basi rotundo-cordato, duplicato-dentato; petiolo petiolulisque valde armatis glandulosisque; inflorescentiis racemoso- vel subpaniculato-corymbiformibus valde armatis; fructibus subglobois 8 mm. diametro.—NEW HAMPSHIRE: clearings, alluvial terrace of Androscoggin River, Pontook Dam, Dummer, Coös County, September 6, 1917, *Fernald & Pease*, no. 15,649 (TYPE in Herb. Gray.; ISOTYPES in Herb. New Engl. Bot. Cl. and elsewhere).

Rubus sceleratus was so designated by Dr. Ezra Brainerd shortly before his death but, although duplicates of the large series were sent out under that name 30 years ago, I am surprised to find that the name he gave did not get published. The species is the most fiercely armed of any I have ever encountered in the field, comparable only with *R. pugnax* Bailey, Gent. Herb. v. fasc. viii. 524, fig. 235 (1944), which I know only in the herbarium. But, whereas true *R. pugnax* (type-series from Hartland, Connecticut) has the primocane quite glabrous and armed with pale and very broad-based prickles without intermixed glands, *R. sceleratus* has the primocanes densely crowded with stipitate glands, setae and fulvous prickles much more slender than in *R. pugnax*. The inflorescence of *R. pugnax* is similar to that of *R. allegheniensis*, an essentially simple and cylindric



Photo. B. G. Schubert

RUBUS ALLEGHENIENSIS, forma SUFFULTUS: FIG. 1, portion of fruiting branch, $\times \frac{1}{2}$, from TYPE-SERIES.

R. ALLEGHENIENSIS, var. POPULIFOLIUS: FIG. 2, portion of fruiting branch, $\times \frac{1}{2}$, from TYPE-SERIES.

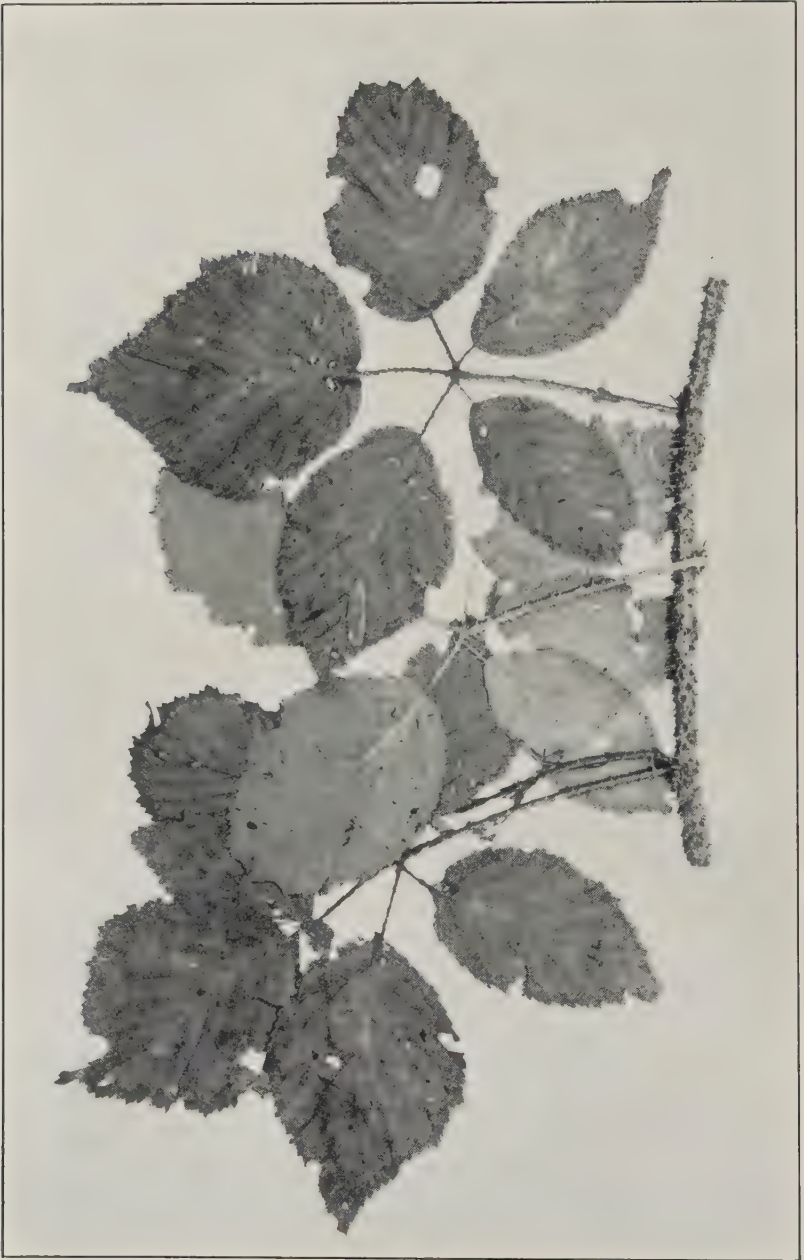


Photo. B. G. Schubert

RUBUS SCCLERATUS: small portion of branchlet of primocane, $\times \frac{2}{3}$, from TYPE-SERIES.



Photo. B. G. Schubert

RUBUS SCALERATUS: small portion of branchlet of floricanne, $\times \frac{2}{5}$, from TYPE-SERIES.

raceme; that of *R. sceleratus* more corymbiform, with the pedicels often changed to forking branches; *i. e.*, it is related to the inclusive *R. glandicaulis* Blanchard. From that common species of southeastern Canada and northern New England it is at once distinguished by the very intricately branching and doming habit, the coarse and crowded prickles of the primocane, the strong armature of petiole and petiolule, the dense tomentum (instead of thin pilosity) of the lower leaf-surface, the spreading (instead of appressed or nearly wanting) pubescence of the nerves of the lower surface and the armed inflorescence.

At the big dam at Dummer *Rubus sceleratus* covered a very extensive area of recently burned clearing. While Pease and I were vainly struggling to secure some representative pieces without tearing to shreds the entrapped foliage (a nearly impossible task; note the illustrations), the keeper of the dam came to express his wonder at our performance and the hope that we would destroy several acres of the pest. Asked what kind of bramble he called it, his feelings were promptly indicated by his reply: "It's a damn nuisance!" Whereupon Pease and I, further struggling to get specimens without too seriously lacerating ourselves, composed a tentative name from Dummerdam and the conventional ending, *ensis*. Sending material to the Reverend Doctor Brainerd, who was then deep in his study of the genus, I received a letter, stating that the name we had used was a bad hybrid of profane English and Latin and that he was calling it *R. sceleratus*. He won but he did not find the opportunity to publish his milder profanity.

2. RHIZOME-CHARACTERS IN AND MINOR FORMS OF VIOLA

(PLATES 1133-1136)

In studying the genus *Viola* as it occurs in eastern North America several cases have been noted where the plants with vernal petaliferous flowers would seem to indicate the need of uniting what have generally or often been considered distinct species. In view, however, of the prolonged and very painstaking study, reinforced by cultivation of and experimentation with our species and their hybrids by the late Ezra Brainerd, I, naturally, hesitated to make hasty and less considered changes. In seeking for characters not generally used but which, in care-

fully collected material, seem very real, I have turned to the vegetative reproduction and the rhizomes, features which in some other groups have been found to be quite stable. One of the cases in which the striking differences in the rhizome are already recognized is that of the eastern *V. canadensis* L., of rich mesophytic and deciduous forest of southeastern Canada and the eastern states, and the Cordilleran and mid-western *V. rugulosa* Greene, which in Wisconsin and Minnesota meets the generally more eastern plants (in Wisconsin, Dr. Fassett informs me, often characterizing shaded bluffs of Niagara limestone, rather than the more typical mesophytic forests). Very slight differences in outline of leaf and degree of scariousness of stipules have been noted but these are rather evasive and difficult to define. When, however, the subterranean parts are carefully dug it is found that the eastern *V. canadensis* is non-stoloniferous and with a stout rhizome (PLATE 1133, FIG. 1) and thick crown; whereas the western *V. rugulosa* spreads by slender, flexuous and freely forking subterranean stoloniform rhizomes (FIG. 2), these setting new crowns at their tips. So long as people are satisfied to snatch the plants without carefully digging the subterranean parts they will struggle to make out the differences. In fact Greene, describing *V. rugulosa* from Minnesota, without mention of stolons, followed it by the stoloniferous *V. Rydbergii*, the Rocky Mountain plant with slender stolons. Carefully made collections from the type-station in Minnesota of *V. rugulosa*, however, show the long and flexuous stolons of *V. Rydbergii*.

The very definite *Viola tripartita* Ell. is in its typical form at once distinguished from *V. hastata* Michx. by having the lower leaves of the foliaceous summit sharply divided into long narrow segments or lobes, but the later leaves are uncleft and suggest those of *V. hastata*. To increase the difficulty, there is an extreme form of *V. tripartita* with all the leaves uncleft, this form, forma *glaberrima*¹, so much simulating *V. hastata* that I find

¹ *VIOLA TRIPARTITA* ELL., forma **glaberrima** (Chapm.), stat. nov. *V. hastata* Michx., ♂.? DC. Prodr. i. 300 (1824)—without name, although by Harper said to have been called "var. *glaberrima* Ging.". *V. hastata*, var. *glaberrima* [wrongly ascribed to Ging.] Chapman, Fl. So. U. S. ed. 3: 34 (1897). *V. tripartita glaberrima* Harper in Bull. Torr. Bot. Cl. xxvii. 337 (1900). The citation of Gingins as the basic author seems to be erroneous. In DeCandolle's Prodr. A. P. DeCandolle prepared the treatment except in cases where Gingins was actually cited.

nearly a quarter of the specimens of the two in the Gray Herbarium originally misidentified. Dr. Roland Harper has pointed out that in *V. hastata* the young leaves are flat, those of *V. tripartita* plicate, but that this difference does not show in pressed specimens. If, however, one has carefully collected material the rhizomes make the differentiation simple: the rhizome of *V. tripartita* and its forma *glaberrima* (PLATE 1133, FIG. 3) is subligneous, blackish and densely covered with long fibrous roots; that of *V. hastata* (FIG. 4) fleshy, whitish, coarsely toothed and subtuberosus, strongly simulating the rhizome of *Dentaria* or of *Medeola*. Had the earlier authors noted the very different rhizomes they would hardly have united the two species.

The last cases to be noted here are in the usually recognized stoloniferous series. So long as the circumpolar *Viola palustris* L. has violet corollas and stays in alpine and subalpine ravines the flowering plants are quickly distinguished from those of the smaller-flowered *V. pallens* (Banks) Brainerd. There is no difficulty in distinguishing fruiting material, since the grayish seeds of *V. palustris* are 1.5–1.7 mm. long and a full mm. thick, the blackish seeds of *V. pallens* 1–1.4 mm. long and only 0.7–0.8 mm. thick. The trouble is with flowering material of *V. palustris*, forma *albiflora* Neum., which is found in subalpine ravines of Newfoundland. Both plants have deliciously fragrant vernal flowers and the difference in size is trifling. However, when properly collected *V. palustris* shows stiff and cord-like stolons 1–1.5 mm. thick, *V. pallens* having the stolons slenderly thread-like and flexuous. If the former is merely grabbed the crucial character will be missed.

Some acute field-botanists have asserted that, after all, *V. lanceolata* L. and *V. primulifolia* L. are merely leaf-variations of a single polymorphous species. Had they closely watched their growth-habit after the vernal flowering they would have seen a pretty striking difference. In *V. lanceolata*, very soon after the vernal flowering, the rhizome or crown sends out leafy prostrate stolons bearing cleistogamous flowers. By midsummer these highly fruitful leafy stolons form mats (PLATE 1134, FIG. 1) and by late autumn one finds extensive and close carpets with abundant dehiscing capsules. This character was clearly described more than a century ago, when Torrey & Gray (Fl. N. Am. i. 139

(1838)) wrote: "Rhizoma creeping; often bearing very long creeping stolons with an apetalous flower on a short peduncle at each joint". Of the hundreds of collections of *V. lanceolata* before me essentially all which show plants past vernal flowering exhibit the floriferous and leafy stolons.

In *Viola primulifolia*, however, it is a very exceptional plant which shows many or any cleistogamous flowers on the stolons; and up to midsummer the very long and freely forking stolons remain leafless or essentially so, the cleistogamous flowers being on erect and prolonged peduncles borne chiefly from the crowns or from the first nodes of the stolons (PLATE 1135, FIG. 1).¹ Much later in the season, in September and October, the stolons may bear well developed leaves but no (or very exceptional) short-stalked cleistogenes. This final production of leaves on the stolons, which eventually end in new crowns, and the absence of cleistogenes except from the crowns, is well displayed in an isotype (*Harper*, no. 1675, from near Moultrie, Georgia, coll. September 25, 1902) of *V. reptabunda* Greene, Leaflets, ii. 94 (1910), our PLATE 1135, FIGS. 2 and 3. Such autumnal development of leaves on the stolons is shown in many specimens of typical cordate- or subcordate-leaved *V. primulifolia*² and its north-ranging var. *acuta*.

The last of these plants to consider is *Viola vittata* Greene, Pittonia, iii. 258 (1898) or *V. lanceolata* L., var. *vittata* (Greene) Weath. & Griseb. in RHODORA, xxxvi. 48 (1934), a plant of the

¹ The specimen from which this figure was made (*Fernald & Long*, no. 21,925 from Arcadia, Nova Scotia, July 29, 1920) is of *V. primulifolia*, var. *acuta* (Bigelow) Torr. & Gray, l. c. (1838), this based on *V. acuta* Bigelow, Fl. Bost. ed. 2: 95 (1824), which came from "Cambridge [Mass.], particularly about the pine trees on Craigie's road [now Brattle Street], in moderately damp soil". Edward Tuckerman deposited in the Gray Herbarium material which he marked as identical with Bigelow's plant, adding that Bigelow had sent him specimens from the original station. The latter locality, "the pine trees on Craigie's road", was apparently the wet depression beneath large white pines between Brattle and Craigie Streets, which was still conspicuous when the present writer came to Cambridge in 1891.

² When *V. primulifolia*, forma *subcordata* Griscom in RHODORA, xxxviii. 50 (1936) was defined: "Foliis maioribus subcordatis vel rariore cordatis, saepe crassioris vel rugosis", growing from Florida "North along the coast to southeastern Maryland", the Linnaean account of typical *V. primulifolia* was apparently not given sufficient weight: "foliis oblongis subcordatis" followed by "*Folia cordata, oblonga, obtusissima, crenata, basi decurrentia per petiolum, omnino ut in Primula officinali.*". Typical *V. primulifolia*, with cordate to subcordate leaves, extends northward on the Coastal Plain to New Jersey and inland from the Gulf to Oklahoma. Var. *acuta*, with blades not cordate, reaches Nova Scotia, New Brunswick, central Maine, southern Quebec, southern Ontario, Michigan and Minnesota.

southern Coastal Plain, extending north to southern New Jersey and inland to Coffee County, Tennessee. At vernal flowering the leaves and flowers are often indistinguishable from those of typical *V. lanceolata* but as the season advances the new leaves are greatly prolonged and narrow, with lance-linear blades 0.6–3 dm. long, their margins often (but not always) more denticulate, the peduncles relatively high. However, the evident transition in foliage induced Weatherby & Griscom to treat it as a variety of *V. lanceolata*, a course which Alphonso Wood had indicated on the label of a Georgia specimen from Professor William T. Feay more than 80 years ago (Wood's manuscript name not published). In southeastern Virginia the few known colonies of *V. vittata* (or var. *vittata*) show none of the leafy superficial stolons with axillary cleistogenes which characterize typical *V. lanceolata* (PLATE 1134, FIG. 1). Instead, the plant spreads by slender cord-like subterranean rhizomes which at their tips set new leafy crowns (PLATE 1134, FIG. 2). Since, however, the plant is more abundant southward I have asked for and received the loan of the material in the Britton Herbarium of the New York Botanical Garden for which I am very thankful. This series and that of the Gray Herbarium, although often duplicating one another, are mutually very helpful, for the latter series contains material from three southern states not represented in the former. Furthermore, while the rhizome-character receives much confirmation, the presence of superficial flowering stolons is apparent in several plants which, in their very prolonged leaves, are otherwise good *V. vittata*. Of the 77 specimens studied a few are so carelessly collected as to give no evidence, but 43 clearly show the subterranean rhizome and no superficial stolons, while 12 collections as clearly show the superficial leafy stolons, some of them bearing axillary cleistogenes as in typical *V. lanceolata*. Among these superficially stoloniferous plants may be cited *Small*, no. 8710 from Indian River, Coco, Florida; *Tracy*, no. 5006 from Biloxi, Mississippi; and *Brainerd*, no. 179, raised from Biloxi roots. Such plants as these seem to indicate that, in spite of the great length of the leaves and the generally non-stoloniferous habit, *V. vittata* is perhaps better considered a well defined southern variety of the more widely dispersed and usually shorter-leaved *V. lanceolata*. Such transitional material sug-

gests the need of also watching closely the behavior of *V. canadensis* (PLATE 1133, FIG. 1) and *V. rugulosa* (FIG. 2).

The following minor forms may be noted:

V. PEDATA L., var. *LINEARILOBA* DC., forma **ranunculifolia** (Juss.), stat. nov. *V. ranunculifolia* Juss. ex Poir. Encycl. viii. 626 (1808). *V. pedata*, γ. *ranunculifolia* (Juss.) Gingins ex DC. Prodr. i. 291 (1824) as to source of name, not as to plant described.

Forma *ranunculifolia* (see PLATE 1136, FIGS. 1 and 2) occurs rather rarely through much of the range of typical var. *lineari-loba*; specimens before me from Massachusetts, Rhode Island, North Carolina, South Carolina and Georgia. A leaf and a flower from Jussieu's TYPE are shown in PLATE 1136, FIGS. 1 and 2. Although the name, used in varietal rank by Gingins in DeCandolle's Prodr. was taken over directly from Jussieu, the plant he had before him in the Prodr. herbarium of DeCandolle belonged to the next form.

V. PEDATA L., var. *LINEARILOBA* DC., forma **cuneatiloba** Brainerd in herb., f. nov. (TAB. 1136, FIG. 3), segmentis foliorum cuneato-obovatis leviter incisis.—TYPE from 3000 ft. alt., Kate's Mountain, near White Sulphur Springs, Greenbrier Co., West Virginia, May 16, 1892, *J. K. Small* in Herb. Gray.

The type and another sheet in the Gray Herbarium bear Brainerd's annotation-labels. These and several others bear a later unpublished combination. Some sheets have Brainerd's intimation that these plants with broadly cuneate and but slightly cleft leaf-segments are specimens with autumnal foliage. This annotation appears beside a plant from Woburn, Massachusetts, with flowers expanded; all other specimens of this form are indicated as collected in May or show expanded flowers. Not only do these sheets bear unpublished annotations. Most of the sheets of forma *cuneatiloba* bear an unpublished combination by Brainerd with a basonym which was published later than Jussieu's name. Similar annotations are presumably in other herbaria.

V. FIMBRIATULA Sm. forma **umbelliflora**, f. nov. (TAB. 1136, FIG. 4), pedunculis trifloris, floribus subumbellatis; foliis basin versus valde incisis. TYPE from Halifax, Nova Scotia, July 20, 1912, *J. Richard Lunt* in Herb. Gray.

Forma *umbelliflora* is an extraordinary departure from the common and typical *Viola fimbriatula*, for the latter, like all the

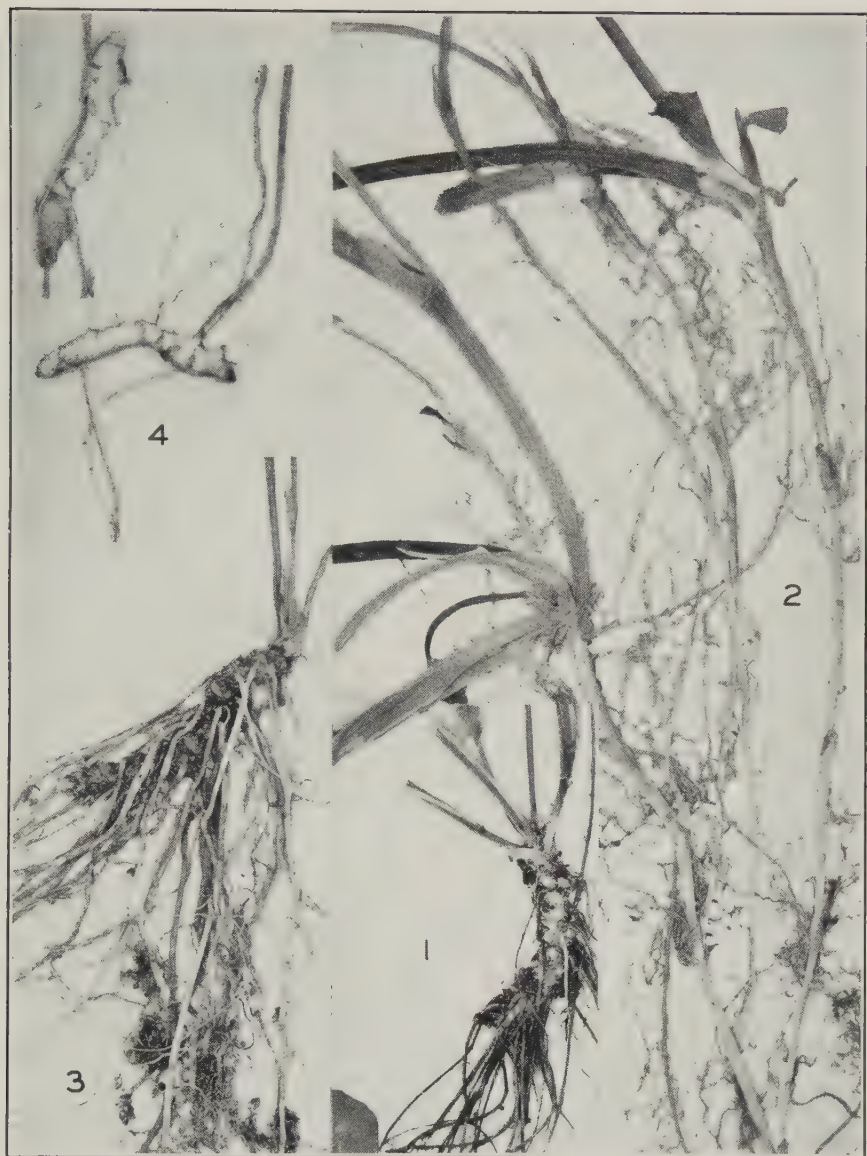


Photo. B. G. Schubert

RHIZOMES OF VIOLA, $\times 1$: FIG. 1, *V. CANADENSIS*; FIG. 2, *V. RUGULOSA*; FIG. 3, *V. TRIPARTITA*, forma *GLABERRIMA*; FIG. 4, *V. HASTATA*.



Photo. B. G. Schubert

RHIZOMES OF VIOLA, $\times 1$: FIG. 1, *V. lanceolata*; FIG. 2, *V. lanceolata*, var. *vittata* (*V. vittata*).



Photo. B. G. Schubert

RHIZOMES OF *VIOLA PRIMULIFOLIA*, $\times 1$: FIG. 1, var. *ACUTA* from Nova Scotia; FIGS. 2 and 3, typical plant from Georgia (isotype of *V. reptabunda* Greene).



Photo. B. G. Schubert

TYPES IN VIOLA, all figs. $\times 1$: FIGS. 1 and 2, *V. PEDATA*, var. *LINEARILOBA*, forma *RANUNCULIFOLIA*; FIG. 3, forma *CUNEATILOBA*; FIG. 4, *V. FIMBRIATULA*, forma *UMBELLIFLORA*.

species of the *Cucullata* group of *Viola*, has single-flowered peduncles. Unfortunately Mr. Lunt did not record more explicitly than Halifax, the locality; but here is a plant which should be sought by Nova Scotians.¹

V. ADUNCA Sm., var. **minor** (Hook.), comb. nov. *V. Muhlenbergiana*, β . *minor* Hook. Fl. Bor.-Am. i. 78 (1830). *V. labradorica* Schrank in Denkschr. Bot. Ges. Regensb. i². 12 (1818). *V. adunca*, var. *glabra* Brainerd in RHODORA, xv. 109 (1913). *V. adunca*, forma *glabra* (Brainerd) G. N. Jones in Univ. Wash. Publ. Biol. v. 194 (1936).

In taking up var. *minor* for the glabrous and commonly more boreal or subalpine extreme of *Viola adunca* the earliest varietal name is revived. Hooker's variety was based on citations of plants of various authors under the name *V. debilis* Pursh, not Michx., including the Richardson material. A specimen of the latter labelled *V. debilis* by Richardson himself is the same as var. *glabra* of Brainerd. I have sought in vain for any character to hold the latter apart from *V. labradorica*. The var. *minor* (or *glabra*) in eastern North America extends 900 miles farther north than typical puberulent *V. adunca*; and at its southern limit in the East it ascends into alpine areas, typical *V. adunca* in the East never doing so.

EXPLANATION OF PLATES 1133-1136

PLATE 1133, RHIZOMES OF VIOLA: FIG. 1, *V. CANADENSIS* L., $\times 1$, from Hudson Falls, Washington Co., New York, May 24, 1918, *House*; FIG. 2, *V. RUGULOSA* Greene (*V. Rydbergii* Greene), $\times 1$, originally from Boulder, Colorado, transplanted to Middlebury, Vermont, and distrib. in Brainerd's Violets of E. N. Am., no. 138; FIG. 3, *V. TRIPARTITA* Ell., forma *GLABERRIMA* (Chapm.) Fern., $\times 1$, from north of Fort Payne, DeKalb Co., Alabama, *Svenson*, no. 7701, as *V. hastata*; FIG. 4, two rhizomes, $\times 1$, of *V. HASTATA* Michx. from Tallulah Falls, Georgia, *Perry & Strahan*, no. 948.

PLATE 1134, RHIZOMES OF VIOLA: FIG. 1, *V. LANCEOLATA* L., $\times 1$, from Bridgewater, Nova Scotia, *Fernald & Long*, no. 24,180; FIG. 2, *V. LANCEOLATA*, var. *VITTATA* (Greene) Weath. & Grisc. (*V. vittata* Greene), $\times 1$, from Whitefield's Millpond, southwest of Corinth, Southampton Co., Virginia, *Fernald & Long*, no. 14,368.

PLATE 1135, RHIZOMES OF VIOLA: FIG. 1, *V. PRIMULIFOLIA* L., var. *ACUTA* (Bigel.) Torr. & Gray, $\times 1$, from Arcadia, Nova Scotia, *Fernald & Long*, no. 21,925; FIGS. 2 and 3, typical *V. PRIMULIFOLIA*, from ISOTYPE of *V. reptabunda* Greene, $\times 1$, from near Moultrie, Colquitt Co., Georgia, *Harper*, no. 1675.

PLATE 1136: FIGS. 1 and 2, leaf and flower of TYPE, $\times \frac{1}{2}$, of *VIOLA PEDATA* L., var. *LINEARILOBA* DC., forma *RANUNCULIFOLIA* (Juss.) Fern. (*V. ranunculifolia* Juss.); FIG. 3, portion of TYPE, $\times 1$, of *V. PEDATA*, var. *LINEARILOBA*, forma *CUNEATILOBA* Brainerd; FIG. 4, portion of TYPE, $\times 1$, of *V. FIMBRIATULA* Sm., forma *UMBELLIFLORA* Fern.

¹ On the same trip Mr. Lunt, on July 18, collected *Calamagrostis cinnoides* (Muhl.) Bart., the locality given simply as Halifax, this the first evidence of the species from east of York County, Maine.

A NEW SPECIES OF SARCOSTEMMA
FROM OKLAHOMAU. T. WATERFALL¹

A COLLECTION of *Sarcostemma* was made by the author in the Black Mesa Area of the Oklahoma panhandle in June, 1948. It appeared possibly referable to *S. heterophylla* which it resembled in having peduncles longer than the pedicels, and plane leaves. However that species has flowers about 8 or 9 mm. in diameter², and the corolla-lobes have fimbriate margins.³ The Black Mesa *Sarcostemma* has larger flowers, about 17–20 mm. in diameter, and the margins are smooth. The corollas, with their oblong, obtuse lobes which are glabrous internally and sparsely short-pubescent externally, more nearly resemble those of *S. crispum*. However the latter species has flowers about 12–13 mm. in diameter, the corolla-lobes are ciliate, the peduncles and pedicels are often about equal in length, and the leaf-margins are usually crisped. The species from the Black Mesa is further characterized by having laterally bilobed coronal vesicles, a distinguishing feature found in neither of the other species with which it might be confused. Believing this to be a distinct species, the author is describing it under *Sarcostemma* in accordance with Woodson's conclusions⁴ regarding the inadvisability of attempting to maintain *Funastrum* and *Philibertia*. If the two be retained as distinct genera, the present species would obviously fall in *Funastrum*.

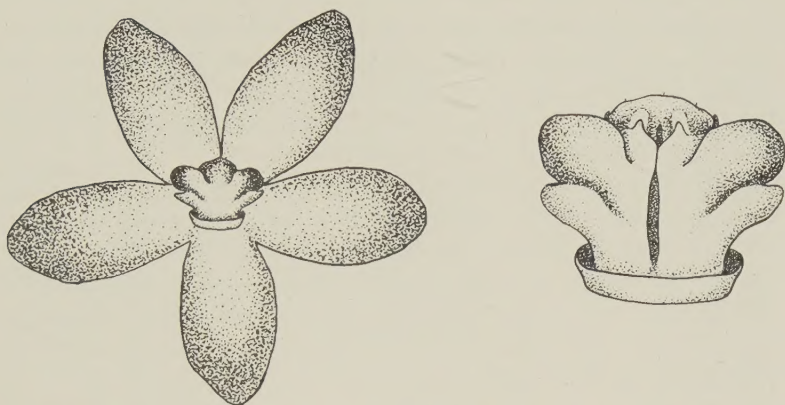
SARCOSTEMMA lobata, sp. nov. Caules volubiles, sparse recurvato-puberuli; folia sparse puberula, anguste linearia (4–10 cm. longa, 0.5–2.0 cm. lata ad basim), laminae basibus auriculato-hastatis vel auriculato-cordatis vel obtusis, petiolis 5–10 mm. longis; pedunculi 3–6 cm. longi, 2- vel 5-flori, pedicellis 1–2 cm. longis; sepala linearia vel lineari-lanceolata; flores 17–20 mm. diametro, petalis extrorsum sparse puberulis introrsum glabris, oblongis vel ovato-oblongis obtusis, 8–10 mm. longis 4 mm. latis, annulis 0.5–0.7 mm. altis, coronae segmentis lobatis.

¹ Botanist, Oklahoma Biological Survey.

² Torrey, John. *Bot. Mex. Bound.* 161. 1858.

³ Torrey, John. *U. S. Rep. Explor. Miss. Pacif.* 5: 362. 1858.

⁴ Woodson, Robt. E. *North American Asclepiadaceae. I.* Ann. Mo. Bot. Gard. 28: 216–217. 1941.



SARCOSTEMMA LOBATA: FIG. 1 (left), open flower from the TYPE, actual diameter 2 cm.; FIG. 2 (right), gynostegium, actual diameter 2 mm. Drawings by Helen Skinner.

The TYPE is: *Waterfall* 7914, collected from sand around white sandstone north of the Black Mesa, three miles north and one-half mile west of Kenton, Cimarron County, June 13, 1948. It is in the Bebb Herbarium of the University of Oklahoma. ISOTYPES are in the Gray Herbarium, and the herbaria of the Missouri and New York Botanical Gardens. Growing with the type collection of *Sarcostemma lobata* were *Asclepias macrotis*, *Oryzopsis hymenoides*, and a *Physalis* sp., possibly *P. Fendleri*. *Sarcostemma lobata* was also collected as *Waterfall* 7928, slopes of buttes six miles south of Kenton, Cimarron County, June 14, 1948.

DEPT. OF PLANT SCIENCES, UNIVERSITY OF OKLAHOMA,
Norman, Oklahoma.

HERBARIUM TECHNIQUE.—Pressed and dried plant material may be softened for dissection by the use of a solution of "Tide." Probably "Vel," "Dreft," or any of the detergents now on the market, would do as well. No particular formula is needed; use perhaps a teaspoon of Tide to a pint of water and stir rather than shake to avoid forming suds. Softening action is practically instantaneous, and material need not be removed from a herbarium sheet as for boiling. This method is particularly

convenient for grasses; just put a drop of Tide solution on a spikelet and dissect. After dissection, excess solution may be soaked up with a cloth or blotter. A small bottle of solution keeps for several months, and eventually molds, but the cost and time for replacement are negligible.

Seeds and other small objects, a millimeter or less in diameter, are most easily picked up by use of a stylus made of a narrow strip of cellulose acetate (safety film), cut to a fine point. Rub the stylus once or twice against the clothes, and it will pick up a small object by static electricity, holding it with such tenacity that it must be pushed off with a needle.—N. C. FASSETT, University of Wisconsin.

DIERVILLA SESSILIFOLIA IN VIRGINIA.—In August, 1948, while motoring south from Front Royal, Virginia, along the Skyline Drive in the Shenandoah National Park, I left the car after going a few miles and took one of the trails which led out to a rocky promontory on Hogback Mountain in Warren County. Here, overlooking the Shenandoah Valley at an elevation of about 3,000 feet, I found growing in dry rocky soil several bushes of the southern *Diervilla sessilifolia* Buckley. I have seen this frequently farther south in the Blue Ridge mountains of North Carolina but never before in Virginia. Small gives its northern limit as North Carolina and Tennessee and it is not included in the 7th edition of Gray.

Having been found now in the mountains of northwest Virginia, it should be looked for farther south along the Blue Ridge in that State.—FRANCIS WELLES HUNNEWELL, Gray Herbarium.

Volume 51, no. 602, containing pages 13-32, and plate 1119, was issued 18 February, 1949.

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